In a natural classification of the genus the most fundamental separation appears to me that along the dotted line *a b* dividing the non-stridulating from the stridulating species. This division once made, the stridulating species fall into two natural subdivisions, expressed in the table by the line *c d*, which divides the brevicorn from the longicorn forms.

I think the most convenient classification is obtained by dividing the species along the two lines *a b*, *c d* into three subgenera, one identical with the "Langoustes longicornes" of Milne-Edwards, the others formed by splitting up the "Langoustes ordinaires" into species with and species without a stridulating organ.

The following table embodies the proposed arrangement:—

Genus PALINURUS, Fabr.

A. Stridulating organ absent; rostrum well developed, clasped by paired pedate processes of the antennulary sternum; procephalic processes present; coxocerites imperfectly fused; antennulary flagella short (sub-genus *Jasus*, T.J.P.).
P. lalandii, *P. edwardsii*, *P. hügellii*, *P. tumidus*.

B. Stridulating organ present; rostrum variable, but rarely (? never) as well developed as in (A); pedate clasping processes absent; procephalic processes absent.

a. Antennulary sternum narrow below, bases of antennules being hidden, in a view from above, by bases of antennæ; coxocerites imperfectly fused; antennulary flagella short (sub-genus *Palinurus*).

α. Rostrum well developed, covering ophthalmic sternum. *P. trigonus*.

β. Rostrum reduced to a small spiniform tubercle; ophthalmic sternum uncovered. *P. vulgaris*.

b. Antennulary sternum broad below, bases of antennules being visible from the dorsal aspect; coxocerites perfectly fused; antennulary flagella long (sub-genus *Panulirus*, Gray; *Senex*, Pfeiffer). *P. interruptus*, *P. fasciatus*, &c., &c.

Dunedin, N.Z., October 2 T. JEFFERY PARKER

SCIENTIFIC SERIALS

Bulletin of the Belgian Royal Academy of Sciences and Belles Lettres, October 4.—Obituary notices of the late M. Joseph Plateau, by MM. Duprez, Valerius, and Liagre.—Second communication on the discovery of the fossil iguanodon at Bernissart, by P. J. Van Beneden.—Researches on the absolute force of the muscles of the Invertebrates; Part I. Absolute force of the adductor muscles in the lamellibranch molluscs (four illustrations), by M. Félix Plateau.—Note on a new optical illusion, by H. Valerius.—Remarks on the action of lightning conductors constructed on the Melsens system, by H. Valerius.—Arithmetical and algebraic theorems, by E. Catalan.—Note on the pelvisternum in the Edentates (ten illustrations), by Prof. Paul Albrecht.—Funeral oration of M. Henri Conscience in Flemish and French, by M. Pierre Willems.—Memoir on the bibliography of international law before the publication of Grotius's "Jus belli et pacis" (1625), by Alphonse Rivier.—Confession de Poète, a poem, by Charles Potvin.—Some traits of the social life of the Celestial Empire. How history is manufactured in China; civil and military decrees, by Ch. de Harlez.—Reports on the competitive papers sent in on the subject of Grétry, a critical study of his life and works. The prize, a gold medal of the intrinsic value of 32*l*., was awarded to M. Michel Breuet of Paris.—Reports on the competitive papers received on the subject of realism, its definition and influence on contemporary painting. The essay by M. Henry Hymans, a member of the Academy, was pronounced the best. But the prize, also a gold medal worth 32*l*., was not awarded to him, owing to his failure to comply with the conditions of the competition.—Discourse on the annual exhibition of paintings, by M. Fetis. The prize of a thousand francs for the best cartoon on the subject of help for the wounded on the battle-field, as a decorative piece for a military hospital, was awarded to M. Henri Evrard, of Saint Gilles-lez-Bruxelles.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, December 6.—"The Wave-lengths of A, *a*, and of some Prominent Lines in the Infra-Red of the Visible Spectrum." By Capt. Abney, R.E., F.R.S.

M. Fievez has recently sent the author a map of the solar spectrum from C to A ("Annales de l'Observatoire Royal de Bruxelles," nouvelle série, tome v.) inclusive, and as part of this region is one which he is measuring, he examined the new publication with great interest. Photography and eye measurements do not coincide in the detail of the grouping of the little *a* group, or from there as far as A, and A itself is shown by M. Fievez's map as wanting in some details which appear in the photographs. The wave-lengths of the different lines from above "*a*" to A are not tho e given by Fievez, when comparison photographs o the 1st order of the red with the 2nd of the ultra-violet weref taken on the same photographic plate, or when the 2nd order of the red is compared with the 3rd order of the green taken in a similar manner. Prof. Rowland's concave gratings were employed for this comparison. Cornu's map was used as a reference for the ultra-violet wave-lengths, and Ångström's map for those in the blue and green.

Description of line	λ from comparison of 1st and 2nd orders	λ from comparison of 2nd and 3rd orders	λ according to Fievez	Remarks
"*a*"	7184·4 7185·4	7184·5 7185·4	7197·7 7198·7	This is shown in Ångström's map as a single line λ 7184·9.
Most refrangible edge of A.	7593·6	7593·7	7600·0	Ångström gives 7604 for the centre of this line; which of the bands he took as A is not clear. Langley gave 7600·9 for this edge.
Centre of 6th pair of lines in the flutings following A.	7644·2	7644·33	7652·2	

The determination of A has been made by Mascart, Smythe, and others, besides Ångström and Langley, with discordant results. The above may be taken as accurate, as are Cornu's and Ångström's maps.

The following are wave-lengths of some of the principal lines in the infra-red. The scale numbers refer to the author's map of the infra-red, which is published in the *Phil. Trans.*, Part II., 1880:—

Scale number	Description	Wave-lengths
1046	This line is a double, of which the components have the accompanying wave-lengths.....	8226·4 8229·9
1441	.....	8496·8
1509	.....	8540·6
1685	.....	8661·0
2175	A double line, the components of which have the accompanying wave-lengths	8986·2 8989·5
2638	,, ,, ,,	9494·5 9500·1
3161	.....	9633·8

Mathematical Society, December 13.—S. Roberts, F.R.S., vice-president, in the chair.—The following were elected members:—Messrs. A. B. Basset, H. Fortey, R. T. Glazebrook, F.R.S., G. Heppel, J. J. Thomson, H. H. Turner, and Prof. W. Thomson, Cape Colony.—The following papers were communicated:—The form of standing waves on the surface of running water, by Lord Rayleigh, F.R.S.—A method of finding the plane sections of a surface and some considerations as to its extension to space of more than three dimensions, by Mr. W. J.

C. Sharp.—On a deduction from the elliptic-integral formula $y = \sin(A + B + C \ldots)$, by Mr. J. Griffiths.

Linnean Society, December 6.—Sir John Lubbock, Bart., president, in the chair.—H.H. Maharajah of Travancore, and Messrs. C. A. Barber, E. Bostock, H. Friend, J. Hannington, J. S. Hicks, J. Richardson, R. Tate, and H. Tisdall were elected Fellows of the Society.—Mr. B. Daydon Jackson exhibited a specimen of "Mexican whisks," known also in the London market as "chien-dent," which are now imported in considerable quantity from the vicinity of La Puebla in Mexico. It is believed to be derived from a species of *Andropogon*, but is in bulk coarser than the similar material from Southern Europe from *Andropogon gryllus*, and finer than the species of *Panicum* used in India for brushes.—Mr. Arthur Bennett exhibited a specimen of *Carex ligerica* gathered by Mr. Cunnack on the Scilly Isles (Cornwall), and believed by him to be a sterile form of *C. arenaria*, but identified as *C. ligerica* by Prof. Babington, and therefore new to science. Mr. Bennett also drew attention to locally so-called "vegetable hedgehogs," these being agglomerated larch leaves (having some resemblance to a rolled hedgehog) found in the Shropshire meres.—A large number of Lepidoptera from the district of Georgetown, Colorado, and a few from Missouri were exhibited by Mr. Ernest Jacob, who had collected them while engaged in the U.S.A. Geological Survey in the above districts, 1880-81.—A series of dried plants from Australia were shown on behalf of Mr. James Robertson.—Mr. Charles Darwin's paper on instinct (noticed in our last week's issue) was then read by the Zoological Secretary, and an important discussion followed, in which Mr. Wallace, Profs. Huxley, Allman, Mivart, Foster, Lankester, Mr. McLachlan, Mr. Seebohm, and others took part.

Zoological Society, December 4.—Prof. W. H. Flower, F.R.S., president, in the chair.—Mr. Philip Crowley, F.Z.S., exhibited and made remarks on an egg of a Bower-bird from Southern New Guinea, supposed to be that of *Chlamydodera cerviniventris*.—Sir Joseph Fayrer, F.Z.S., exhibited a shed deer-horn, apparently gnawed by other deer, and made remarks on this subject.—Mr. Sclater exhibited, on the part of Dr. George Bennett, F.Z.S., four skins of a species of Paradise-bird of the genus *Drepanornis*, obtained in the vicinity of Port Moresby in Southern New Guinea. Mr. Sclater considered this form to be only subspecifically different from *D. albertisi* of North-eastern New Guinea.—Mr. W. Burton, F.Z.S., exhibited a supposed hybrid between a male blackcock and a hen pheasant.—Mr. R. Bowdler Sharpe gave descriptions of some new species of Flower-peckers, viz.:—*Dicæum sulaense*, from the Sula Islands; *D. pulchrius*, from South-eastern New Guinea; and *D. tristrami*, from the Solomon Islands. The author added some critical notes on other species of *Dicæum* and *Prionochilus*.—Mr. J. B. Sutton read a paper on the diseases of monkeys dying in the Society's Gardens, on which he gave many interesting details. Mr. Sutton called special attention to the prevalence of the belief that monkeys in confinement generally die of tuberculosis, and showed that such is not really the case.—Mr. H. O. Forbes, F.Z.S., read a paper describing the peculiar habits of a spider (*Thomisus decipiens*) as observed by him in Sumatra.—A second paper by Mr. Forbes gave an account of some rare birds from the Moluccas and from Timor Laut. To this the author added the description of a new species of Ground-Thrush from Timor Laut, which he proposed to call *Geocichla machiki*, in acknowledgment of services rendered to him by Dr. Julius Machik in Sumatra.—A communication was read from Prof. J. von Haast, F.R.S., containing notes on *Ziphius* (*Epiodon*) *novæzealandiæ*, in continuation of a former paper read before the Society on the same subject.—A second communication from Prof. Haast gave a description of a large Southern Rorqual (*Physalus* (*Balænoptera*) *australis*) which had been washed ashore dead on the New Brighton beach about five miles from Christchurch, New Zealand. Prof. Haast was doubtful as to the distinctness of this animal from *Balænoptera musculus* of the Northern Atlantic.—Mr. G. French Angas, C.M.Z.S., read some notes on the terrestrial Mollusca of Dominica collected during a recent visit to that island.

Mineralogical Society, December 11.—The Rev. Prof. Bonney, president, in the chair.—The following papers were read:—On some specimens of lava from Old Providence Island, by the President.—On the evidence of the occurrence of nickel iron with Widmanstätten's figures in the basalt of North Greenland, by Prof. K. T. V. Steenstrup.—Note on a new mode of occurrence of garnet, by H. Louis.—A chemical examination of the Greenland telluric iron (translated from "Medelelser fra Grönland," Heft 4, 1883), by Joh. Lerenzon.—At 9 p.m. (pursuant to notice) the meeting was made special, and the members of the Crystallographical Society were elected members of the Society, a portion of the rules relating to election being for the time suspended.

DUBLIN

University Experimental Science Association, Nov. 13.—Prof. V. Ball in the chair.—On the magnetophone, by Prof. Fitzgerald. A new form of the instrument was exhibited by W. V. Dixon. In this a diaphragm removed from a telephone is placed in close proximity with one extremity of a bar magnet, at the other extremity of which small masses of soft iron fixed radially on an axle are rotated. A note is produced at the diaphragm.—On the phenomena attending pressure on sensitive plates, by W. Hogg. Experiments confirmatory of those described by Capt. Abney were made, and enlarged photos of the developed marks shown. Similar experiments on sensitive albuminised paper were described by P. M. Crosthwaite; the use of paper allowed of considerable pressure being applied.—On compound locomotives, by F. Trouton.—On the identification of minerals by means of their specific heats, by J. Joly.—On the deposition of metallic copper in cracks, by N. M'J. Falkiner.—Experiments gave results similar to those obtained by Becquerel

MANCHESTER

Literary and Philosophical Society, November 27.—H. E. Roscoe, F.R.S., president, in the chair.—On the fungus of the salmon disease—*Saprolegnia ferax*, by H. Marshall Ward, M.A., Fellow of Christ College, Cambridge.

PARIS

Academy of Sciences, December 10.—M. Blanchard, president, in the chair.—Note on a new compound of rhodium, by M. H. Debray.—On the quantities forming a group of nonions analogous to the quaternions of Hamilton, by M. J. Sylvester.—Summary report on the geological, botanical, zoological, and anthropological work accomplished by the French mission to Cape Horn, by Dr. Hyades. In the southern islands of the Fuegian Archipelago the prevailing rocks were found to be schists and granites greatly weathered wherever unprotected by vegetation. The dwarf Antarctic beech is limited to an altitude of 400 metres, the *Fagus betuloides* to 300, forming with the Drimys and Berberis a forest zone with a humid soil poor in vegetable humus, and covered with mosses, heaths, and a considerable variety of small plants. The marine flora abounds in all kinds of algæ (the most common being the *Macrocystis pyrifera*), affording a shelter to numerous zoophytes, Annelidæ, mollusks, Crustaceæ, and migratory fishes of eight or ten species. Of the shell-fish, which abound on most of the seaboard, all the large species are edible. Although poorer than the marine, the land fauna includes several species of Coleoptera, Lepidoptera, Arachnidæ, some forty species of birds, but no reptiles or frogs. The mammals are represented only by one species of fox, two rodents, and an otter, besides the domestic dog. The natives all belong to the Tekeenika stock of Fitzroy, called Yahgans by the present English missionaries. They speak an agglutinating language current from the middle of Beagle Passage to the southernmost islands about Cape Horn. About 1000 words of this language were collected, including some abstract terms, such as *tree*, *flower*, *fish*, *shell*. The numerals get no further than *three*, although the natives count also on the fingers. Over a hundred anthropometric observations were taken on individuals of all ages and both sexes. Good photographs were also obtained of a large number of Fuegians, besides numerous castings of all parts of the body, some skeletons, and a great variety of ethnological materials.—Note on the *Phylloxera gallicola*, by M. F. Henneguy.—Observations on the new planet 235 made at the Observatory of Paris (equatorial of the west tower), by M. G. Bigourdan.—Observation of the spectrum of the comet Pons-Brooks, 1812, at the 14-inch equatorial (0·378 m.) of the Bordeaux Observatory, by M. G. Rayet.—On the form of the expressions of the mutual distances in the problem of three bodies, by M. A. Lindstedt.—On the number of the permutations of n elements presenting s sequences, by M. D. André.—Note on a theorem of Liouville, by M. Stieltjes.—New demonstration of two theorems

of M. Bertrand, by M. Georges Ossian Bonnet.—Formulas giving the electric resistance of the circuit employed in the Edison system of electrical lighting, by M. G. Guéroult.—Observations relative to a method of studying earth currents, in connection with a communication recently made by M. Blavier, by M. F. Larroque.—Researches on the solidification of superfused sulphur (second part), by M. D. Gernez.—Determination of the equivalent of aluminium by means of its sulphate, by M. H. Baubigny.—On the formation of acetylene at the expense of the iodoform, by M. P. Cazeneuve.—New researches on the susceptibility of the eye to differences of luminous intensity, by M. Aug. Charpentier.—Cholera, small-pox, typhoid fever, and charbon amongst the coppersmiths of Villedieu, by M. Bochefontaine. Although the whole atmosphere of the place is, so to say, saturated with copper, nine of the inhabitants of Villedieu, all engaged in the copper industry, fell victims to cholera in 1849. Considering the difference of population, this would represent a mortality of 5700 in Paris. Nearly half of the population was attacked by small-pox in 1870, and a fatal case of charbon occurred in 1865.—On the existence and distribution of eleïdine in the bucco-œsophagian mucous membrane of mammals, by M. L. Ranvier.—On the genus Vesquia, a fossil yew found in the Aachen formations of Tournai, by M. C. Eg. Bertrand.—On a luminous phenomenon observed after sunset at Amiens on several evenings about the end of November and beginning of December last, by M. Decharme. The author feels inclined to attribute these effects to the aurora borealis. Details of similar manifestations observed in other places were quoted from a recent number of NATURE.

BERLIN

Physical Society, November 30.—Dr. Kayser placed before the meeting a concave grating sent by Prof. Rowland to the Physical Institute, explained the principle of this apparatus, and exhibited a photograph of the normal spectrum produced by help of the grating, as also a negative prepared by Prof. Rowland, on which Dr. Kayser was able with the naked eye to count between the two H lines over seventy fine lines, among which some appeared to form groups, so that by means of a microscope many more lines still would be distinguishable.—Prof. von Helmholtz next gave a minute report of the continuation of the experiments he had instituted with a view to explaining galvanic polarisation according to thermodynamic principles. Suppose that an electric current passed through a liquid completely free of gas, then would the gases generated by decomposition of the electrolyte be first absorbed by the liquid, and only after the latter was saturated to a degree corresponding with the pressure of gas resting on it would the development of gas begin. The previous solution of gas in the liquid was the expression of an attraction or of a molecular energy between the water and the gas, which acted in the same direction as did the electromotive energy which decomposed the electrolyte at the electrode. The absorption of the gas, therefore, agreeably with the teaching of the mathematical theory, increased the electromotive energy, and all the more so the less gas the liquid contained. This accorded with the experience derived from experiments that the convective current was so much the stronger by how much the less gas the fluid had absorbed. If the liquid already contained gas in solution, a part of it would escape at the surface by a kind of dissociation, and form above the liquid an atmosphere the pressure of which corresponded with that of the momentary saturation of the liquid. This dissociation of the solution represented a work which could reciprocally be applied to the conversion of gas to a liquid state; that is to say, supposing the conditions were such that the temperature of the system was maintained throughout unaltered, the whole process was a reversible one. With this consideration let one start from any normal condition whatsoever, from atmospheric pressure for example, then it was the teaching of the theory that the work was all the greater the less was the quantity of gas in solution, and in the case of very small gas volumes the work would be endless, that is to say, in every fluid were dissolved minute quantities of gas which could no longer be discharged. If the electrolytic fluid contained oxygen in solution, as in fact was regularly the case, the oxygen would be drawn by convection towards the oxygenous electrode, and there augmented by the oxygen which had been electrolytically separated, and after loss of its electricity become neutral. The gas would now begin to diffuse itself towards the other, the hydrogenous electrode, and this diffusion would produce the polarisation current which, just as much as the diffusion stream, was opposed to the electrolytic current and convection. The quantity of oxygen in the fluid and its diffusion might be illustrated by a curve which ascended from the hydrogenous electrode as its zero point rectilinearly to the oxygenous electrode, and so long as the electromotive force remained the same at the electrodes a state of equilibrium was maintained between electromotive force, convection, polarisation current, and diffusion; a state of equilibrium which was disturbed when the current was interrupted for however short a time. The theory of these processes taught, what experience confirmed, that a much greater electromotive force was required after the interruption to re-establish electrolysis than was before needed to continue the process. If the fluid were saturated with gas to a degree corresponding with the pressure of gas resting on it, the gases generated by electrolysis escaped. Seeing, however, that the degree of saturation was dependent on the pressure of gas, therefore, with the increase of gas pressure, the electromotive force which caused the development of gas would likewise have to be increased. It was now sought to ascertain the least electromotive force that was sufficient under a definite pressure to cause a development of gas, and the experiments made with this object in view showed that the development of the first bubbles had to overcome a considerable resistance, and therefore demanded intenser currents than were needed for later gas bubbles. When, by a definite current through an extended metallic wire, gas was developed in an electrolyte, by lessening the electromotive force it was possible to produce only single gas bubbles at one point of the wire. The same amount of electromotive force which was sufficient to produce this effect was not, however, equal to the generation of bubbles from the outset. To effect this latter result, a much stronger current would have to be employed. All these processes and relations here briefly indicated were mathematically calculated, and the results of the experiments invariably coincided with the teachings of the theory.

CONTENTS